

In re Application of REMACLE J, ET AL.
Confirmation No.: 7897
Application No.: 10/723,091
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REMARKS

Claims 1-20 are pending. Objections to the specification have been withdrawn. The following rejections were also withdrawn: 35 U.S.C. § 112, second paragraph; 35 U.S.C. § 102(b) over MacBeath and U.S.C. § 103 over MacBeath in view of Lauks and Lazar.

Claim 1 has been amended to include reference to the simultaneous contacting of the polyol and protein with the solid support in the same step. Support for this amendment is found throughout the specification. See, for example, page 12, paragraph 57-58; page 15, paragraph 71-72. No new matter is added by virtue of this amendment and its entry is respectfully requested.

Claim Rejections Under 35 U.S.C. § 102

Claims 1-3, 5 and 8-12 are rejected under 35 U.S.C. § 102(b) as being anticipated by Decker et al. (GB 2,016,687). [Based on the species beads as being the broad claimed microarray, as claimed.]

Applicants respectfully traverse.

The present invention is based on the finding that a method for the preparation of protein microarrays comprising the steps of contacting both a protein to be attached and a solution containing a C₅₋₇ polyol linked to another molecule, such as maltitol, in a specific concentration, covalent fixation of the protein on the solid support and drying permits long time storage of the microarrays for periods of at least 6 months at refrigeration temperature without deactivation of the proteins immobilized. The usage of modified polyols, such as maltitol, which is known to exhibit a diminished energy content in comparison to other sugars, confers hereby the additional advantage of reduced metabolism by bacteria, which in turn contributes to an elongated storage of the microarray. Another advantage resides in that the present microarrays are suitable for immediate use since no protecting layer or solution has to be removed.

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Decker et al. relates to the stabilization of protein arrays with sugars. A protein is applied directly or by means of a spacer to a solid support and afterwards stabilized by coating with sugar containing solution, such as 10% mannitol on phosphate buffered saline. Furthermore, Decker specifies a different order of method steps, i.e. a stabilization step subsequent a coating step with protein (Decker, p. 2, lines 12 to 15). The instant invention is directed, in part, to the simultaneous contacting of the polyol and protein with the solid support in the same step. Applicants have amended independent claim 1 to indicate that the polyol and protein are simultaneously contacted. Support for this amendment is found throughout the specification. See, for example, page 12, paragraph 57-58; page 15, paragraph 71-72. Decker also does not teach or disclose a protein deposition on discrete regions of the solid support, nor, the use of polyols linked to other molecules is not disclosed. Applicants submit that Decker et al do not teach or disclose each and every limitation of the instant invention.

In view thereof, Applicants respectfully request reconsideration and withdrawal of the instant rejection.

Claims 1-5, 8-10 and 12-15 are rejected under 35 U.S.C. § 102(b) as being anticipated by Devereaux *et al.* (WO 93/07466).

Applicants respectfully disagree.

Devereaux et al. (WO 93/07466) pertains to a method for protecting of proteins immobilized on a solid support. The method consists of attaching proteins to a solid support, followed by coating with a matrix and drying of the matrix. The matrix is contacted to a solvent (e.g. water) prior usage. Devereaux does not disclose simultaneous contacting of polyols and capture probes with the solid support. Further, Devereaux does not teach or disclose protein deposition on discrete regions of the solid support nor the use of polyols linked to other molecules. Applicants submit that Devereaux et al do not teach or disclose each and every limitation of the instant invention.

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In view thereof, Applicants respectfully request reconsideration and withdrawal of the instant rejection.

Claims 1-3, 5 and 8-12 are rejected under 35 U.S.C. § 102(e) as being anticipated by Stillman et al. (20030175827).

Applicants respectfully traverse.

Stillman et al. discusses a method for the preparation of a stable thin, film dried protein composition on a surface of e.g. a solid support. A thin film of a protein containing solution is applied to the surface of a solid support together with a saccharide, such as xylitol or mannitol, for stabilizing the protein during drying. Stillman does not teach or disclose polyols linked to other molecules nor the covalent binding of the peptides to the support. Applicants submit that Stillman does not teach or disclose each and every claim limitation of the instant invention.

In view thereof, Applicants respectfully request reconsideration and withdrawal of the instant rejection.

Claim Rejections Under 35 U.S.C. § 103

Claims 1-15 and 18-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over any one of Decker or Devereaux or Stillman in view of either Guo (Faming Zhuanli Shenqing Gongkai) or Sandford (US 2003/0134294).

Applicants respectfully traverse.

Decker, Devereaux and Stillman have been discussed above. None of these references taken alone or in combination teach or disclose the instant invention.

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Guo does not teach at the use of C₅₋₇ polyols which preserve the activity of proteins in a microarray. Sandford relates to a method for immobilizing and stabilizing a biological substance on a polyurethane hydrogel. The hydrogel is prepared by polymerization of isocyanate and polyols (of a molecular weight of at least 2000) followed by application of the biological substance. Additionally, an additive, such as sorbitol, may be added after to stabilize the biological substance. Sandford does not teach or disclose simultaneous contacting of a protein and a polyol linked to another molecule with the support nor specifies drying of the spotting solution. Additionally, Sandford does not mention a protein deposition on discrete regions of the support.

None of the references taken alone or in combination teach or disclose the instant invention. In view thereof, Applicants respectfully request reconsideration and withdrawal of the instant rejection.

Claims 16 and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over any one of Decker or Devereaux or Stillman in view of either Guo (Faming Zhuanli Shenqing Gongkai) or Sandford (US 2003/0134294) as applied to claims 1-15 and 18-20 above, and further in view of Moreadith (USP 6632934).

All references except Moreadith have been discussed above. Moreadith relates *inter alia* to the use of male germ cell specific proteins and polypeptides in the preparation of fusion protein carriers. Moreadith neither relates to protein arrays nor specifies the usage of polyols baked to other molecules for stabilizing arrays. Stillman relates to short term stabilization of protein arrays to avoid e.g. denaturation during drying.

None of these references teach contacting a C₅ to C₇ polyol simultaneously with a protein contained in a spotting solution or being present on an array, wherein said polyol is between 0.5 and 10% of the spotting solution, depositing the spotting solution on one of the discrete regions of the surface of a solid support, allowing covalent fixation of the proteins on the

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surface of the support, allowing the spotted solution to dry on the support wherein the proteins retain 70% of their activity when stored in periods of 6 to 12 months.

In view thereof, Applicants respectfully request reconsideration and withdrawal of the instant rejection.

Claims 1-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Decker et al (GB 2,016,687A) in view of Brennan et al US 2005/0053954).

Applicants respectfully traverse. The instant invention teaches a method for the preparation of protein microarrays comprising the steps of contacting both a protein to be attached and a solution containing a C₅₋₇ polyol linked to another molecule, such as maltitol in a specific concentration; covalent fixation of the protein on the solid support; and, drying permits long time storage of the microarrays for periods of at least 6 months at refrigeration temperature without deactivation of the proteins immobilized. The usage of modified polyols, such as maltitol, which is known to exhibit a diminished energy content in comparison to other sugars, confers hereby the additional advantage of reduced metabolism by bacteria, which in turn contributes to an elongated storage of the microarray. Another advantage resides in that the present microarrays are suitable for immediate use since no protecting layer or solution has to be removed.

Decker has been discussed above. Brennan et al. discusses a multi component protein microarray. The array consists of two or more components of a protein-based system entrapped within spots of a biomolecule compatible matrix arranged on a surface. Additives for stabilizing comprise polyols and azides. Brennan et al., does not teach or disclose polyols linked to other molecules nor to their concentration. Additionally, Brennan does not teach the simultaneous contacting of polyols and proteins to the surface of a solid support. Applicants submit that neither Decker or Brennan, alone or in combination, teach or disclose the instant invention.

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In view thereof, Applicants respectfully request reconsideration and withdrawal of the instant rejection.

CONCLUSION

Applicants respectfully request entry of the foregoing amendments and remarks and reconsideration and withdrawal of all rejections. It is respectfully submitted that this application with claims 1-20 is in condition for allowance. If there are any remaining issues or the Examiner believes that a telephone conversation with the Applicants' attorney would be helpful in expediting prosecution of this application, the Examiner is invited to call the undersigned at telephone number shown below.

This response is accompanied by a petition for a three month retroactive extension of time and the required fee. The Commissioner for Patents and Trademarks is hereby authorized to charge the amount due for any retroactive extensions of time and any deficiency in any fees due with the filing of this paper or credit any overpayment in any fees paid on the filing or during prosecution of this application to Deposit Account No. 50-0951.

Respectfully submitted,

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